Anti-Helicopter Digital Proximity Target Detection Device

Authors: Martin Tanenhaus, Tim Geis, Michael Tanenhaus
System Excelerator Inc.

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2131 Defense Highway • Crofton, MD 21114 • 410.721.6893

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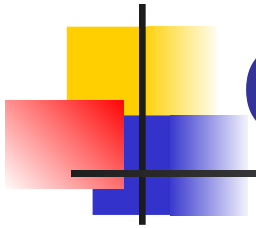


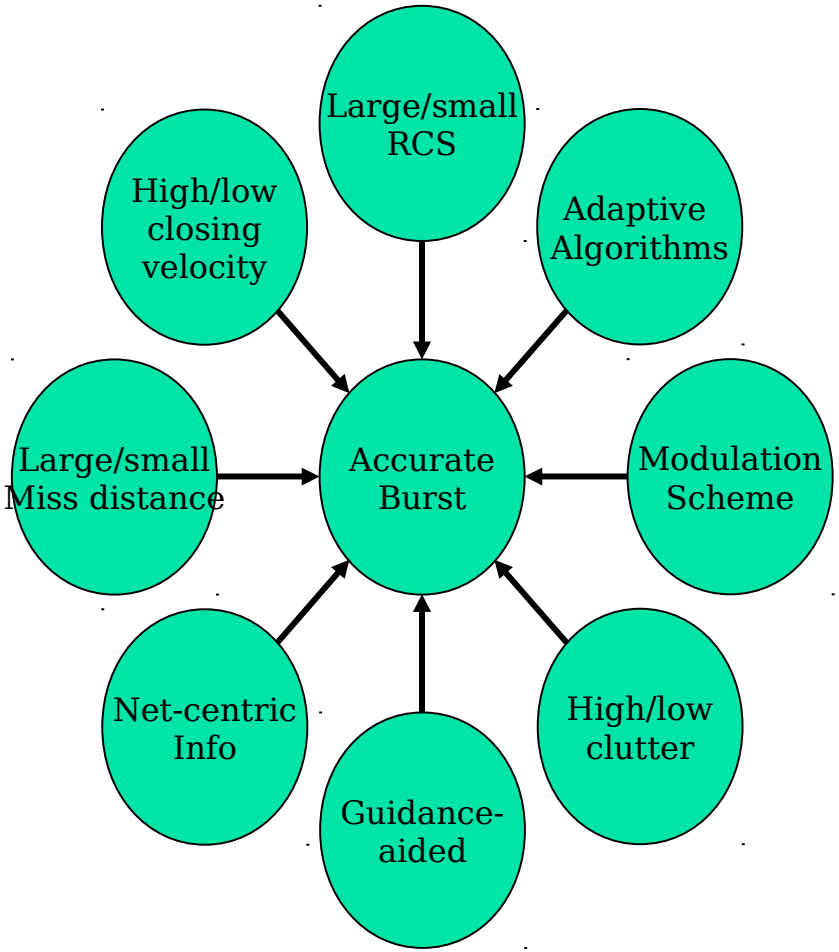
Outline

- Description of Digital TDD
- Operational Scenarios
- Algorithm Approach Differences
- Performance Examples
- TDD Features
- Future Directions
- Progress/Status

Description of the Digital TDD

- Intelligent, small, low cost design that operates in severe clutter/ECM environment
- Advanced targets Like Helicopters and Bunkers
- Low Cost COTS components in micro-package size
- DSP based design for dynamic hardware/behavior controls
- Achieves precise burst control
  - Eliminates early bursts due to rotary wing reflections
  - Distinguishes hits from misses
  - Computes accurate stand-off for shaped charge warheads
  - Contains backup Self Destruct function
- Drop-in Replacement for current TDD's
  - Same power, weight, size to minimize ballistic mismatch

TDD Decision Factors



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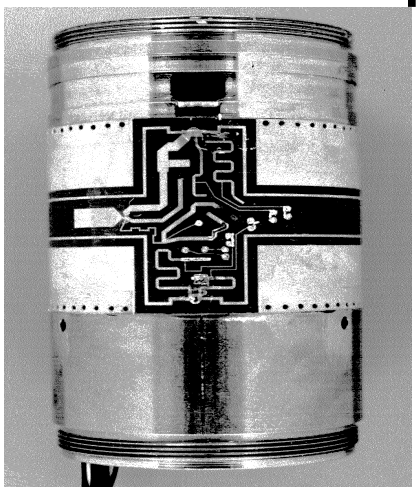
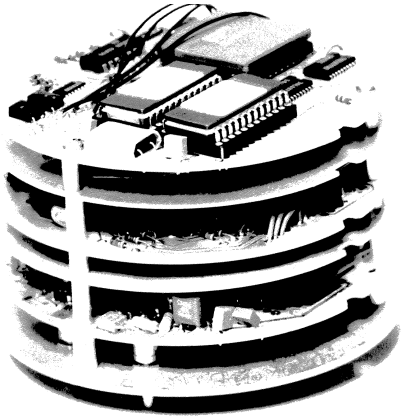
Single Operational Platform to Modular Platform Design

- Past Stinger and Rolling Air Frame Developments

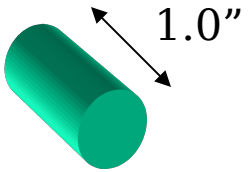


2.75” Diameter



4” Diameter

vs



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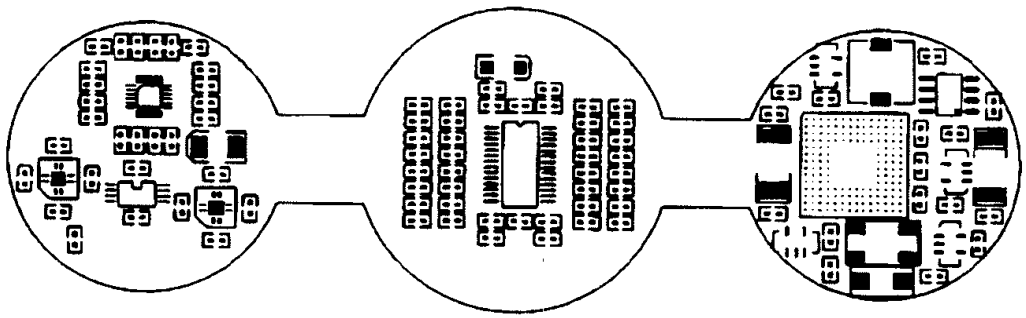
TDD Package Geometry

- Folded into potted ‘Thumb’~1 in high

1.38 in. diameter 420mW (3V)



RF IF and modulator DSP Processor

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Operational Scenarios

- Ground to Air, Air to Air
  - Anti-Helicopter Operations –Rotary Wing Detection
  - Low RCS targets
- Air to Ground
  - Precision stand-off for maximum lethality
  - Penetration and Surface Detonation Modes (Bunker Buster)

Operation Scenario: Dispensing Munitions

- Provides repeatable, reliable dispense height
- Provides precision submunition standoff
- Greatly reduces number of unexploded submunitions
  - Integrated Self-Destruct function

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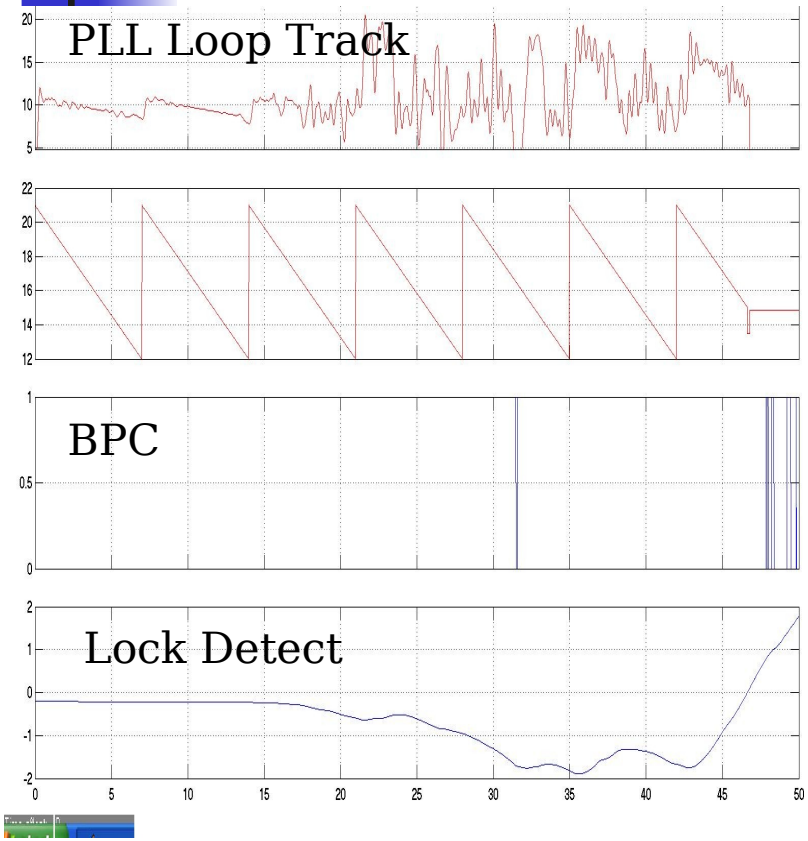
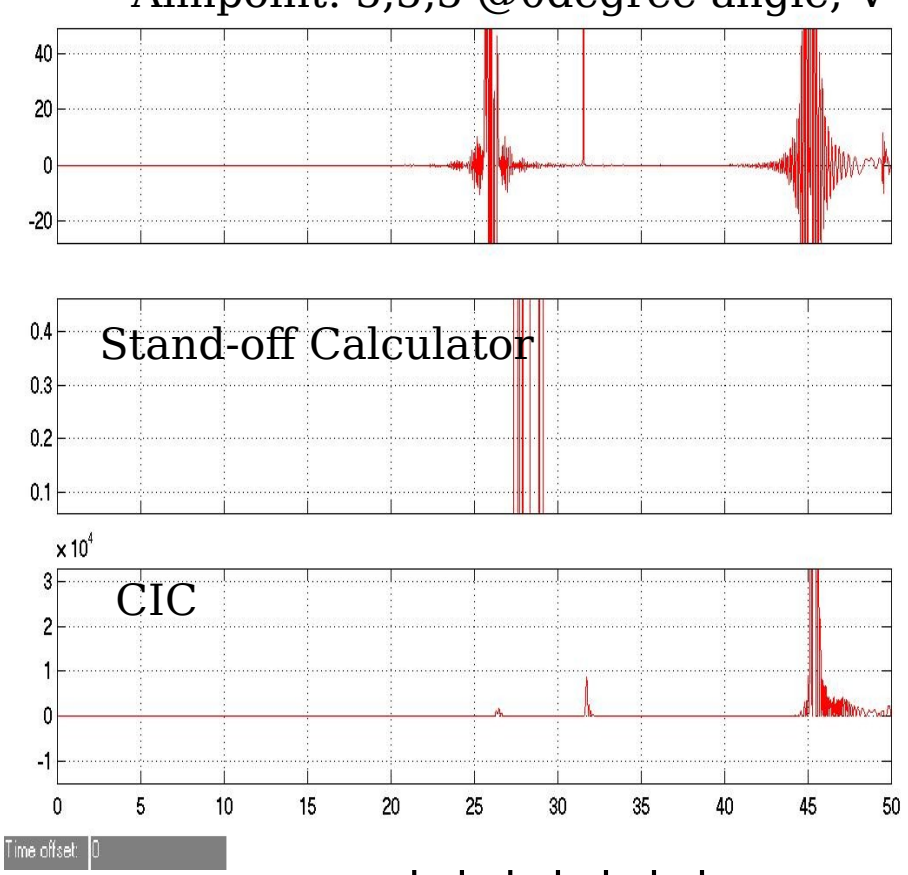
Benefits of Advanced Algorithms

- Current Algorithms are simple, single-minded and vulnerable to clutter and other environmental conditions
- Advanced Algorithms allow processing via multiple simultaneous computations – adaptive; Priority of algorithms drives decision to fire
  - Is the target RCS large or small?
  - Is the target encounter head-on, near miss or is this a large crossing angle type?
  - Is heavy clutter present?
  - Are other interference sources present?
  - What is the best way to obtain the required accuracy of burst for this scenario?
  - Do I need to manage the processor power vs. computational load?

Performance Example



Aimpoint: 5,5,5 @0degree angle, V=1f



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Summarization of TDD

- Modular, COTS based all Digital TDD for use in existing and future platforms
- Low Cost – Low Power
- Supports wide variety of Missions
- Reprogrammable for incremental improvements
- COTS Development Environment for Low Cost Algorithm Development and Evaluation (MATLAB/Simulink and DSP board)

All Digital TDD Status

- Ready for hardware fabrication and test
  - Finalize schematic and layout
- Weapon Specific Tasks
  - Tailor algorithm performance for specific weapon
  - RF Selection Criteria
  - Antenna and Power Source Selection
  - Meet Form/Fit Requirements

Future Directions

- TDD
  - Improved Algorithm Support
- Altimeter
  - Modified Modular Design for Dispenser Weapons
  - UAV Operations
- Guidance Aided Fuze
  - Integrated IMU or Weapon-Based IMU
  - Network Centric Information Node
  - Embedded Instrumentation Module

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SEI Business Information

To discuss business partnerships or marketing relationships contact:

Martin Tanenhaus/CTO (MartinT@systemexcelerator.com)

Direct 407.228-2226, Fax 407.228-2166

Larry Olmo/President, CEO
(LarryO@systemexcelerator.com)

Direct 410.721.6893, Fax 410.721.6894

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